

No. 361 North Rocks Road, North Rocks

Flood Assessment Report

Prepared for EG

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EXECUTIVE SUMMARY

This Flood Assessment Report has been prepared to support a Planning Proposal to City of Parramatta Council for land at 361-365 North Rocks Road, North Rocks (the site).

The site is located on a ridge line and not in proximity to any local creek. In addition, the site is at a higher elevation than the surrounding creeks, and as such mainstream flooding is not a concern. The site does not receive stormwater runoff from off site. A review of available flood information has revealed that the site is not likely located within the 100-year ARI flood extent. Accordingly, the site is not considered to be flood prone, at least by fluvial (main stream) flooding.

The proposed development does not appear to pose any significant implications for the existing flood risk at the site. Should the proposed development be designed to suitably account for on-site drainage and on-site detention, then there are no anticipated implications for flood risk at the site or for surrounding properties.

There are no 'red flag' issues identified, however, there are a few considerations that ought to be noted, as follows:

- New buildings will need to be at a particular elevation above flood planning level. Basement car parking would require additional thought when compared to on-grade buildings. Basement car parking may require access points to be set with a certain freeboard above the flood planning level, not set on grade, which should be considered as part of future design phases.
- The presence of the existing detention basin presents a future liability consideration. Should the existing detention basin be retained, then there may be an ongoing requirement for dam maintenance and safety requirements to be satisfied, such as dam surveillance reports, construction of a spillway and demonstration of dam break risks.
- Although there was no formal structural inspection undertaken, no significant defects were noted in the sub-surface stormwater infrastructure. Should any of the existing subsurface drainage be retained, then the future need to repair the existing stormwater infrastructure is a likely requirement within the lifetime of the new buildings.

Considering the above outlined assessment, the following is recommended:

- A formal flood impact assessment ought to be undertaken to inform the site development application.
- The design of the future site development should account for the existing drainage requirements, as well as requirements for existing and likely increased on-site detention and water quality controls. Input from a Drainage Engineer is recommended during future design stages.
- Survey of sub-surface stormwater infrastructure, and the drainage system under the motorway is recommended prior to future design development.

1 INTRODUCTION

1.1 Purpose of this Report

This Flood Assessment Report has been prepared to support a Planning Proposal to City of Parramatta Council for land at 361-365 North Rocks Road, North Rocks (the site).

The assessment was undertaken by Royal HaskoningDHV (RHDHV) for EG in line with RHDHV's proposal dated 7th August 2018, and further updated in January 2021.

The assessment benefitted from a review of existing relevant information and a site inspection. For the purposes of the assessment, EG provided RHDHV with a detailed topographic survey and an Information Memorandum for the site.

1.2 Planning Proposal

The planning proposal seeks to create North Rocks Village, a Housing Diversity Precinct (HDP) as expressed in Council's Local Strategic Planning Statement (LSPS). It will deliver a genuine mix of housing opportunities within a garden village setting that complements existing neighbourhood character and has the potential to revitalise North Rocks Local Centre. Key elements will comprise:

- A diverse housing mix including freestanding housing, townhouses, terraces, large private garden and terrace style apartments, low-rise apartments as well as seniors living and affordable housing;
- Publicly accessible open spaces including a full-sized oval able to accommodate multi-purpose fields and operate as a village green for the community;
- The creation of a village square with direct pedestrian connection to North Rocks Shopping Centre;
- Embellishment of adjoining Council reserve to improve existing infrastructure;
- Community gardens, walking trails, green and blue connections and public access throughout the site;
- Multiple community spaces to provide for the development of cultural, community and arts programs, including co-working areas, multi-purpose facilities and Hear the Children (RIDBC) Early Intervention service;
- Regular transport connections to major bus interchange at M2; and
- Shared way through the site providing connections to existing pedestrian and cycle links.

1.3 Site Overview

The site is in the City of Parramatta Council LGA and is legally described as Lot 3001 on Deposited Plan (DP) 1115866. The site is currently zoned R2 Low Density Residential. The site has an area of 126,760m² (12.7ha) and currently comprises sports fields, swimming pool, low rise offices, classrooms, dormitory and medical facilities, together with on grade carparking and access roads.

An oblique aerial photograph of the current site is presented below in **Figure 1**.

The site is in the Upper Parramatta River Catchment. The site terrain general slopes gently from North Rocks Road, north to the site boundary adjacent to the M2 Motorway. North of the northern boundary, the terrain becomes steeper and descends to the M2 motorway embankment.



Figure 1: Oblique aerial photograph of the site, looking west. The approximate site boundary is shown by green outline (source: site Information Memorandum).

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PROPOSED CONCEPT MASTER PLAN

The site is proposed to be rezoned from R2 (low density residential) to R3 (medium density residential), R4 (high density residential) and/or B4 (mixed use) and re-developed with predominantly low-rise houses.

North Rocks Village proposes to limit building height to 2-3 storey at the interfaces to residential areas, 4-6 m the central 'spine' of the site, and up to 7 storeys at the rear of the site, which slopes more steeply to the northern boundary.

The footprint for the proposed development and a preliminary layout is shown below in **Figure 2**.



Figure 2: Height masterplan

Figure 3 shows the landscape concept plan:



Figure 3: Landscape Concept Plan

3 REVIEW OF EXISTING INFORMATION

3.1 Preamble

Data was provided to RHDHV by Mecone and EG, including detailed topographic survey. In addition, RHDHV sourced other readily available information. A site inspection was undertaken by Nick Lewis and Caleb Dykman of RHDHV on the 31st August 2018. The site inspection was led by Clerk of Works Mr. Theo Wagner, who provided anecdotal information throughout. It is understood that Mr. Wagner has been working on the site for 20 years.

3.2 Anecdotal Information

Key points communicated to RHDHV by Mr. Wagner during the site inspection are summarised as follows:

- There are no records of overland flooding on the site;
- There has been the occasional issue with blocked stormwater drains at the site;
- The stormwater drains are flushed occasionally, typically every 2-3 years;
- The sewer line is flushed every year;
- Rainfall from the main buildings is collected in five (5) 1000 L water tanks;
- An earth bund was constructed along the eastern site boundary to control runoff leaving the site in response to neighbour complaints; and
- An on-site detention basin was constructed in 2006.

Further details of several the above points are provided later in this report.

3.3 Topographic Data

An elevation plot of the area surrounding the site is presented below in **Figure 4** and highlights the relative location of the site within the upper parts of the Parramatta River catchment. The local creeks in the vicinity of the site, indicated by the areas of lower relief (blue) are named. The site contributes to the Blue Gum Creek catchment. Blue Gum Creek flows into Darling Mills Creek, before flowing into Parramatta River.

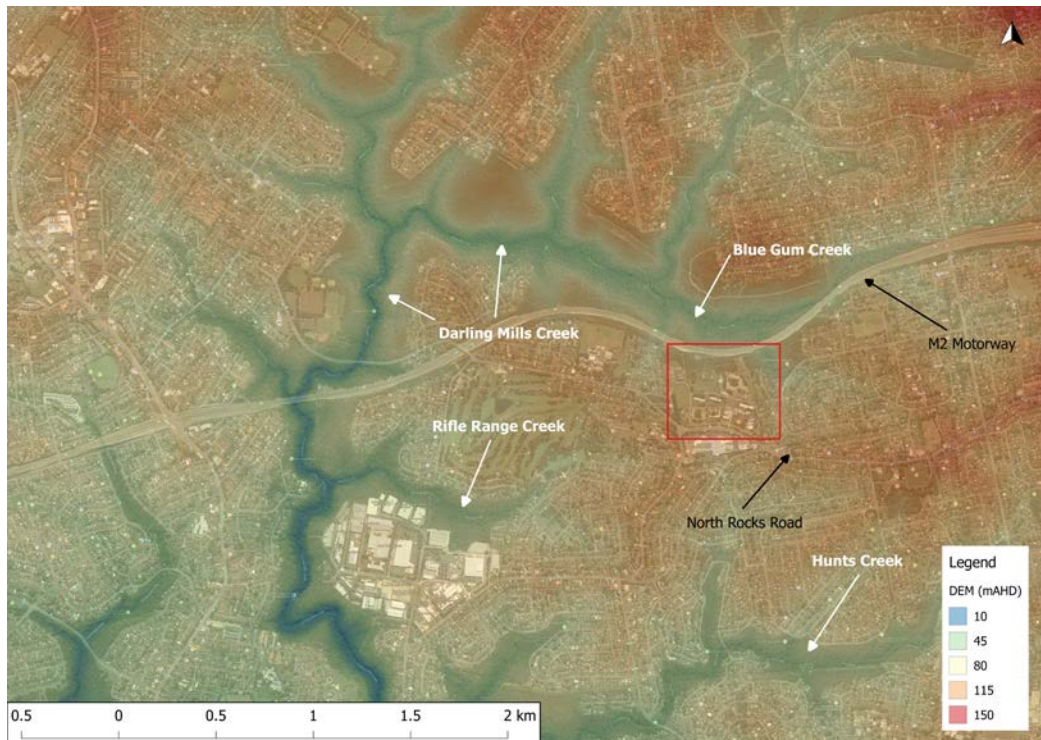


Figure 4: DEM showing relative elevation at the site in relation to the surrounding areas, derived from NSW DPI LiDAR. The site is demarked by red box. Creeks in proximity to the site are labelled.

A detailed topographic survey, undertaken in 2011, was provided to RHDHV by EG. The survey was reviewed, and the topographic survey shows that the site terrain general slopes gently from North Rocks Road, north to the site boundary adjacent to the M2 Motorway. North of the northern boundary, the terrain becomes steeper and dips down towards the motorway. The site is located on a hilltop and falls to the north west and north east.

3.4 Flood Risk Information

There is limited existing published information regarding flooding at the site. The existing Flood Study for the catchment is the Upper Parramatta River Flood Study, which was published in 2003 by Bewsher Consulting. The 2003 Flood Study is available for download on Council's website (scan of original), however the flood extent maps are not clearly viewable.

It is understood that the Upper Parramatta River Flood Study is currently under review by Cardno on behalf of Council, however the study is not yet complete.

RHDHV are currently developing a flood information tool for The City of Parramatta Council. The tool includes a catchment-wide flood model which is based on the original Flood Study catchment model. The RHDHV flood model utilises a coarse-grid direct-rainfall approach. Information from the RHDHV model was reviewed and provided for information. The flood extent for the 100-year Average Recurrence Interval (ARI) is presented below in **Figure 5**. It should be noted that although based on the 2003 flood model, the RHDHV model is not calibrated and does not include local stormwater drainage. The results should be considered indicative only.

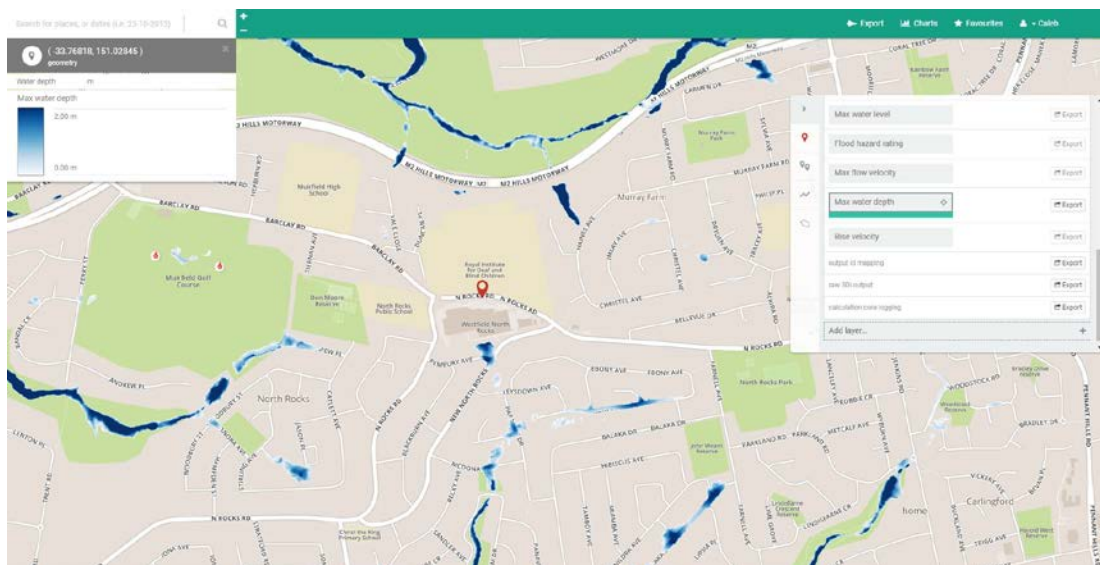


Figure 5: Extract from the RHDHV Upper Parramatta River catchment flood model. The plot shows flood extent and depth for the 100 year ARI flood event.

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SITE OBSERVATIONS

As mentioned above, a site inspection was undertaken by RHDHV personnel on the 31st August 2018. Observations made a part of the site inspection are summarised in the below section.

An overview of the site drainage is presented below in **Figure 6**. The stormwater infrastructure comprises pits with grates, at the surrounding ground level, and pipes varying in diameter. These features are discussed further below, generally from east to west.



Figure 6: General layout of site drainage

1. Runoff from the north east of the site is captured by an earth bund, which was constructed to re-direct runoff and avoid flow passing into adjacent properties (**Figure 7**).



Figure 7: Earth embankment along the north east site boundary. Neighbouring properties can be seen beyond the fence line at a lower elevation than the site.

2. A series of sub-surface pits and pipes convey stormwater through and off the site, generally from south to north, following the general topography. The sub-surface stormwater infrastructure that flows through and then off the site captures only on-site runoff and is not contributed to by off-site catchments.
3. The subsurface drainage infrastructure follows two general alignments, one discharging freely into the north boundary, and the other flowing into a detention basin (described further later on). An example of the grated pits identified throughout the site along the line of the stormwater network is shown below in **Figure 8**.



Figure 8: Grates and inlet pits at the site

4. The subsurface stormwater drainage discharges at or near the northern site boundary. The outlets of the subsurface stormwater infrastructure are presented below in **Figure 9**.



Figure 9: Stormwater outlets along the northern site boundary

5. Most of the site drains into a constructed detention basin (**Figure 10**). The basin is understood to have been constructed in 2006 at the request of the then Upper Parramatta River Catchment Trust. The basin comprises a low flow outlet pipe and embankment.

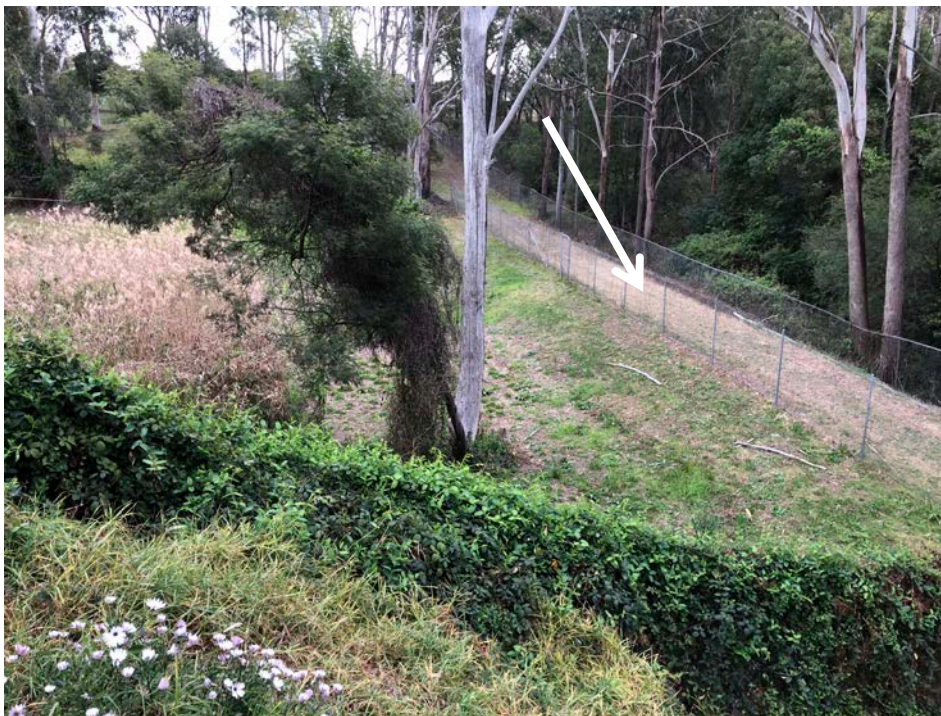


Figure 10: On-site detention basin. The basin embankment is indicated by white arrow.

6. There are two other areas on the site where minor stormwater detention occurs, although these are relatively minor and not formal detention basins.
7. The western portion of the site (playing fields) drains directly off site into street drainage.
8. Downstream (north) of the site, runoff passes under the M2 motorway embankment by what is understood to be a series of concrete drainage swales and a large culvert / bridge structure (**Figure 11**).



Figure 11: Downstream crossing of the M2 motorway (source: Google Earth Pro).

5 DISCUSSION AND RECOMMENDATIONS

5.1 Existing Flooding and Drainage Constraints

As shown above in **Figure 4**, the site is located on a ridge line and not in proximity to any local creek. In addition, the site is at a higher elevation than the surrounding creeks, and as such mainstream flooding is not a concern.

The site does not receive stormwater runoff from off site.

A review of available flood information has revealed that the site is not likely located within the 100-year ARI flood extent. Accordingly, the site is not considered to be flood prone, at least by fluvial (main stream) flooding.

5.2 Implications of Proposed Master Plan

The proposed Master Plan does not appear to pose any significant implications for the existing flood risk at the site. Should the proposed development be designed to suitably account for on-site drainage and on-site detention, then there are no anticipated implications for flood risk at the site or for surrounding properties.

5.3 Red Flag Issues and Considerations

There are no 'red flag' issues identified, however, there are a few considerations that ought to be noted, as follows:

1. New buildings will need to be at a particular elevation above flood planning level. Basement car parking would require additional thought when compared to on-grade buildings. Basement car parking may require access points to be set with a certain freeboard above the flood planning level, not set on grade, which should be considered as part of future design phases.
2. The presence of the existing detention basin presents a future liability consideration. Should the existing detention basin be retained, then there may be an ongoing requirement for dam maintenance and safety requirements to be satisfied, such as dam surveillance reports, construction of a spillway and demonstration of dam break risks.
3. Although there was no formal structural inspection undertaken, no significant defects were noted in the sub-surface stormwater infrastructure. Should any of the existing subsurface drainage be retained, then the future need to repair the existing stormwater infrastructure is a likely requirement within the lifetime of the new buildings.

5.4 Recommendations

Considering the above outlined assessment, the following is recommended:

1. A formal flood impact assessment ought to be undertaken to inform the site development application.

2. The design of the future site development should account for the existing drainage requirements, as well as requirements for existing and likely increased on-site detention and water quality controls. Input from a Drainage Engineer is recommended during future design stages.
3. Survey of sub-surface stormwater infrastructure, and the drainage system under the motorway is recommended prior to future design development.